	Application No.	Applicant(s)	
Notice of Allowability	09/900,059	HOEKMAN ET AL.	
	Examin r	Art Unit	
	Neveen Abel-Jalil	2165	

-- The MAILING DATE of this communication app ars on th cov r sh et with the corr spondenc address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *November 16, 2004*.

2. ☒ The allowed claim(s) is/are *1-20*.

3. ☒ The drawings filed on *July 6, 2001* are accepted by the Examiner.

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some*   c)☐ None   of the:

       1. ☐ Certified copies of the priority documents have been received.

       2. ☐ Certified copies of the priority documents have been received in Application No. _____ .

       3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

    * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application. **THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.

    (a)☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached

       1)☐ hereto or 2)☐ to Paper No./Mail Date _____ .

    (b)☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of

    Paper No./Mail Date _____ .

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachm nt(s)

1. ☐ Notice of References Cited (PTO-892)

2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)

3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date *November 30, 2001*

4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material

5. ☐ Notice of Informal Patent Application (PTO-152)

6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .

7. ☒ Examiner's Amendment/Comment

8. ☒ Examiner's Statement of Reasons for Allowance

9. ☐ Other _____ .

C. Rones

CHARLES RONES
PRIMARY EXAMINER

DETAILED ACTION

Remarks

1.   The amendment filed on November 16, 2004 has been received and entered. Claims 21-33 have been cancelled. Therefore, claims 1-20 are now pending.

EXAMINER'S AMENDMENT

2.   An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. Gzergorz S. Plichta (Attorney of Record) on December 8, 2004.

Amendments to the Claims:

3.   This listing of the claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

4.   The application has been amended as follows:

Claim 1 (currently amended): A method for automatically classifying consonance of audio data, comprising:

applying audio data to a peak detection process;

detecting the location of at least one prominent peak represented by the audio data in ~~the~~

a frequency spectrum and determining the energy of the at least one prominent peak;

storing the location of the at least one prominent peak and the energy of the at least one

prominent peak into at least one output matrix <u>as output matrix data</u>;

applying the <u>output matrix</u> data stored in said at least one output matrix to critical band

masking filtering;

applying the <u>output matrix</u> data stored in said at least one output matrix to a peak

continuation process; and

applying the <u>output matrix</u> data stored in said at least one output matrix to an intervals

calculation process where ~~the~~ <u>a</u> frequency of ratios between peaks are stored into an output

vector for the audio data being classified.

Claim 2 (original): A method according to claim 1, wherein the audio data is divided into frames,

and the method is performed frame by frame.

Claim 3 (original): A method according to claim 2, wherein the frame by frame approach

includes bin differencing to calculate frame derivatives to facilitate the detection of peaks.

Claim 4 (original): A method according to claim 2, wherein the number of peaks detected in said

application of the peak detection process is limited by a pre-defined parameter.

Claim 5 (original): A method according to claim 1, further comprising performing Nth order interpolation on the location of the at least one prominent peak and the energy of the at least one prominent peak to increase precision of the location and energy values for the peak.

Claim 6 (original): A method according to claim 1, further comprising applying the output vector to a classification stage which determines at least one of (1) at least one consonance value and (2) at least one consonance class that describes the audio data.

Claim 7 (original): A method according to claim 1, where the frequency of ratios between peaks are stored into an output vector that is 1.times.24.

Claim 8 (original): A method according to claim 2, wherein the peak continuation process keeps track of peaks that last more than a predetermined number of frames

Claim 9 (original): A method according to claim 8, wherein the peak continuation process fills in a peak when the peak is missed in a previous frame.

Claim 10 (original): A method according to claim 1, wherein said critical band masking filtering removes a peak that is masked by surrounding peaks with more energy

Claim 11 (original): A method according to claim 10, wherein said critical band masking filtering removes a peak when at least one of a lower frequency peak and a higher frequency

peak have greater energy.

Claim 12 (original): A method according to claim 10, wherein said critical band masking filters

are scalable so that the amount of masking is scalable.

Claim 13 (original): A method according to claim 1, wherein said storing includes providing an

output of the peak detection and interpolation stage in two matrices, one holding the location of

the at least one prominent peak, and the second holding the respective energy of the at least one

prominent peak.

Claim 14 (original): A method according to claim 1, wherein the audio data is formatted

according to pulse code modulated format.

Claim 15 (original): A method according to claim 14, wherein the audio data is previously in a

format other than pulse code modulated format, and the method further comprises converting the

audio data to pulse code modulated format from the other format.

Claim 16 (original): The method of claim 1, further comprising converting the input audio data

from the time domain to the frequency domain.

Claim 17 (original): A method according to claim 16, wherein said converting of the input audio

data signal from the time domain to the frequency domain includes performing a fast Fourier

transform on the audio data.

Claim 18 (currently amended): A computer readable medium bearing computer executable

instructions for:

applying audio data to a peak detection process;

detecting the location of at least one prominent peak represented by the audio data in the

a frequency spectrum and determining the energy of the at least one prominent peak;

storing the location of the at least one prominent peak and the energy of the at least one

prominent peak into at least one output matrix as output matrix data;

applying the output matrix data stored in said at least one output matrix to critical band

masking filtering;

applying the output matrix data stored in said at least one output matrix to a peak

continuation process; and

applying the output matrix data stored in said at least one output matrix to an intervals

calculation process where the a frequency of ratios between peaks are stored into an output

vector for the audio data being classified.

Claim 19 (currently amended): A method for automatically classifying consonance of audio data,

comprising:

applying audio data to a peak detection process;

detecting the location of at least one prominent peak represented by the audio data in ~~the~~ a frequency spectrum and determining the energy of the at least one prominent peak;

storing the location of the at least one prominent peak and the energy of the at least one prominent peak into at least one output matrix <u>as output matrix data</u>;

applying the <u>output matrix</u> data stored in said at least one output matrix to critical band masking filtering;

applying the <u>output matrix</u> data stored in said at least one output matrix to a peak continuation process; and

applying the <u>output matrix</u> data stored in said at least one output matrix to an intervals calculation process where ~~the~~ a frequency of ratios between peaks are stored into an output vector for the audio data being classified.

Claim 20 (currently amended): At least one computing device comprising one or more subsystems for:

applying audio data to a peak detection process;

detecting the location of at least one prominent peak represented by the audio data in ~~the~~ a frequency spectrum and determining the energy of the at least one prominent peak;

storing the location of the at least one prominent peak and the energy of the at least one prominent peak into at least one output matrix <u>as output matrix data</u>;

applying the <u>output matrix</u> data stored in said at least one output matrix to critical band masking filtering;

applying the <u>output matrix</u> data stored in said at least one output matrix to a peak

continuation process; and

applying the <u>output matrix</u> data stored in said at least one output matrix to an intervals

calculation process where ~~the~~ <u>a</u> frequency of ratios between peaks are stored into an output

vector for the audio data being classified.

Reasons for Allowance

4.   Claims 1-20 are allowed over the prior art made of record.

5.   The following is a statement of reasons for allowance:

The prior art of record (<u>Blum et al.</u> -U.S. Patent No. 5, 918, 223-and- <u>ST. JOHN</u> -U.S.

Pub. No. 2003/0023444 A1) do not disclose, teach, or suggest the claimed limitations of (<u>in</u>

<u>combination with all other features in the claim</u>), applying the output matrix data stored in said at

least one output matrix to critical band masking filtering; applying the output matrix data stored

in said at least one output matrix to a peak continuation process; and applying the output matrix

data stored in said at least one output matrix to an intervals calculation process where the

frequency of ratios between peaks are stored into an output vector for the audio data being

classified, as claimed in claims 1, 18, 19, and 20.

Claims 2-17 are allowed over the prior art made of record, because they are dependent

from the allowed independent claim 1.

6.   Any comments considered necessary by applicant must be submitted no later than the

payment of the issue fee and, to avoid processing delays, should preferably accompany the issue

fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for

Allowance."

Conclusion

7.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Neveen Abel-Jalil whose telephone number is 571-272-4074.

The examiner can normally be reached on 8:30AM-5: 30PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Dov Popovici can be reached on 571-272-4038. The fax phone number for the

organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Neveen Abel-Jalil
December 10, 2004

CHARLES RONES
PRIMARY EXAMINER